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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: July 17, 1990

SUBJECT: Hi-Mill Manufacturing, Highland, MI -- Review of Draft Remedial Investigation/Endangerment Assessment

FROM: Douglas Beltman, Ecologist D Beltman
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TO: Charles Wilk, RPM
MI/WI Unit #3

As you requested through Steve Ostrodka, I have reviewed the Draft Remedial Investigation/Endangerment Assessment Report for the Hi-Mill Manufacturing site. My review focused on the Environmental Risk Assessment for the wetlands and lakes adjacent to the site.

In general, the conclusion of the Environmental Risk Assessment that the metal contaminants pose no threat to natural resources in the wetlands is not substantiated by the data collected, as explained below. Toxicity tests on contaminated sediment and water are recommended to help determine the extent of contaminant effects on the biota in the wetlands adjacent to the site.

1. Section 2.1.2 Surface-Water and Sediment Investigations. TOC, grain size, and pH measurements should be provided for each sediment sampling location. These parameters can affect metal mobility and bioavailability in a wetland and should be measured along with sediment metals concentrations.

2. Section 2.1.2 The numbering in Fig. 2-1 doesn't correspond to the number of surface water and sediment samples described in the text (pp. 18 and 20). Also, the Waterbury Lake sample locations are not shown. Those samples that were subject to TAL inorganic analysis should be identified in Fig. 2-1.

3. Section 4.4 Summary and Conclusions. The "Surface Water and Sediments" section (p. 86) needs a section number. The first sentence of the second paragraph in this section should read: "The TAL short list metals detected in sediments above background criteria were Al, Cr, Cu, and Zn."

4. Section 6.5 Environmental Risk Assessment. Table 6-17. The Ambient Water Quality Criteria reported in this table are not the appropriate values to use in an ecological assessment. These values given in the table are Maximum Concentration Limits (MCLs) set for regulation of human drinking water. A separate set of water quality criteria has been developed for protection of aquatic life; these criteria are non-regulatory, scientific assessments of pollutant ecological effects. (These criteria are contained in a series of publications titled "Ambient Water Quality Criteria for (pollutant)", U.S. EPA, Office of Water Regulations and Standards,

1980.) The criteria are expressed as acute values (concentrations not to be exceeded at any time) and chronic values (concentrations that 24 hour averages must not exceed). For the metals listed in Table 6-17, these criteria are:

For Cr+6:
acute 21 ug/l
chronic 0.29 ug/l

For Cr+3:
chronic 44 ug/l
The acute level depends on water hardness, but water hardness values not given. 59000 ug/l is almost certainly too high.

For Cu:
Acute levels depend on water hardness. Chronic levels range from 3.9 ug/l to 60.4 ug/l for different freshwater species.

For Zn:
chronic 47 ug/l
Acute toxicity level depends on water hardness.

These Ambient Water Quality Criteria that are protective of aquatic life are well below the MCLs given in table 6-17; for some metals the differences are several orders of magnitude. The measured metal concentrations at the site must be compared against these aquatic life criteria, not the MCLs.

Section 6.5.3 Site/Study Area Description.
A more complete description of the wetlands is necessary. Dominant vegetation, the extent of soil saturation, and seasonal water fluctuations should be included to better characterize the wetlands. The suggestions that the low numbers and diversity of benthic organisms are due to seasonal temperature and water fluctuations must be better substantiated; these explanations seem quite unlikely. Winter freeze occurs in almost all wetlands and small ponds in this region and cannot be the reason for the depauperate benthic community in this wetland. Similarly, claims concerning summer oxygen depletion of these wetlands do not generally apply to all shallow-water environments as the report implies. Finally, changing water levels are normal and essential elements of wetlands and in itself cannot be responsible for the low numbers and diversity of benthic organisms. However, if complete summer dry-down does occur, then benthic fauna would expected to be negatively affected. Dry-down of such a relatively deep water habitat (6-8 ft., as reported on p. 145) is possible, but it should be substantiated with field observations.

The report fails to recognize the very real possibility that the depauperate benthic community is caused by metals contamination from the

Hi-Mill site. Metal levels in the sediment are near levels known to be toxic to biota. Metal levels in the water are also near toxic levels, based on the appropriate Ambient Water Quality Criteria. In addition, water samples for metals analysis were collected in early March when water levels are likely near their yearly highs. Thus the reported metal concentrations in the water are likely lower limits. Finally, the presence of only the pollution-tolerant choronomid midges in the benthic samples is a possible indicator that the metals are affecting the biota. Metals contamination seems to be a much more reasonable explanation for the lack of benthic organisms than either seasonal temperature or water level fluctuations. The Environmental Risk Assessment concludes that risks to biota from metals is minimal because the benthic community is depauperate. Such a conclusion blatantly ignores the possibility that the community is depauperate because of metals contamination.

Toxicity tests on contaminated water and sediment are recommended to determine whether metals contamination is responsible for the depauperate benthic community. Toxicity tests are valuable for a number of reasons:

1. Toxicity tests integrate the effects of all the different metals present, taking into account possible antagonistic or synergistic effects. When a complex mixture of contaminants are present, conclusions based on individual contaminant levels can often be misleading.

2. The bioavailability and toxicity of metals vary greatly with environmental conditions such as pH, TOC, grain size, and the presence of other chemicals. Comparison with toxicity values derived under standard laboratory conditions may not be appropriate for certain site conditions.

In summary, this report falls short of adequately considering the possibility that metals contamination from the Hi-Mill site is responsible for the paucity of benthic organisms in the wetlands area. Toxicity tests are recommended to determine whether metals may be toxic to biota in the wetlands.

If you have any questions or need further assistance in discussing these matters with the PRP or in designing and implementing future sampling plans, please give me a call at 6-5902.

cc: Steve Ostrodka, TSU